of chilled gas (water) which forms in those continuous heating furnaces having an ascending roof and hearth. It is readily seen that in this last case the forcing out of the cold gases by the hot gases flowing into the heating chamber is obstructed to the highest degree.

The performance of these furnaces, when constructed with a horizontal hearth, is slightly better. This type of hearth does not form a pocket for the cold gases, but the flow of the colder gases to the waste-gas port is very nearly cut off by the ingots which are being heated.

In computing the width of the hearth of the furnace it is necessary to give thorough consideration to the fact that the cold gases must be removed from the heating chamber. In practice the hearth is sometimes given a width equal to twice the length of the ingot to

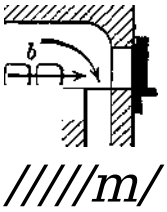

FIG. 118.

be heated, so that at each end of the ingots a wide channel will be formed for the cold gases.

What reason can be assigned for making the hearth so wide? Would it not be better to proportion the width of the furnace more closely to the length of the ingots or billets to be heated? The author has been unable to find any other reply to the foregoing questions than the following: In order that the furnace may operate well and heat uniformly, it is absolutely necessaiy that the burned gases be rapidly and completely carried away from the heating chamber. The side channels, at the two ends of the file or tier of ingots which are being reheated,

form the only path by which these gases may pass from the furnace. If a low temperature at the charging end of the furnace is desired, it is necessary that these channels" should have sufficient width.

In the case shown (Fig. 118), the continuous furnace has the roof and hearth horizontal, and the height of the gas port above the bridge wall is *h;* the height of the working doors is less than this dimension; the waste gases are carried away from the heating